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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/805,182	03/14/2001	Hirohiko Kobayashi	010318	2824

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EXAMINER

MENEFEE, JAMES A

ART UNIT PAPER NUMBER

2828

DATE MAILED: 08/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/805,182

Applicant(s)

KOBAYASHI ET AL.

Examiner

James A. Menefee

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.


- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 17-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.


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Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3. 6) ☐ Other: _____

Art Unit: 2828

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of group I, claims 1-16 in Paper No. 7 is acknowledged. Claims 17-21 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsang (US 5,208,824).

Regarding claim 1, Tsang discloses a DFB laser comprising a first quantum well structure (QW) extending along a resonator direction, said first QW having alternately stacked first barrier 18 and first well layers 17. The well layers 17 will inherently have a bandgap narrower than the barrier layers 18, as this is necessarily the structure of quantum wells. There is an intermediate layer 16 disposed along a resonator direction. There is a second QW periodically disposed along the resonator direction, said second QW having alternately stacked second barrier 131 and second well layers 121,122 with band gaps such as in the first quantum well structure. Tsang differs from the claimed invention in that claim 1 cites that the periodically disposed QW is

above the intermediate layer while the other normal QW is below the intermediate layer. It is the opposite in Tsang. It would have been an obvious aesthetic design choice to switch these so that the periodically disposed QW is disposed on top of the intermediate layer, which is disposed on top of the normal QW, because mere rearrangement of parts is evidence of obviousness. See *In re Japikse*, 86 USPQ 70. From now on, when the first QW from Tsang is discussed, it corresponds to the lower QW of present invention, and when the second QW from Tsang is discussed, it corresponds to the upper QW of present invention. The rejections shall proceed as if the parts have been rearranged as deemed obvious above. The intermediate layer 16 has a thickness larger than the first barrier layers 18, and will necessarily, due to its composition, have a band gap broader than the first well layers 17.

Regarding claim 2, a diffraction grating burying layer 15 is disposed in a resonator direction completely covering the second QW. The burying layer is InP, and will have a band gap broader than the first and second well layers.

Regarding claim 3, it is not disclosed that the intermediate layer has a surface step of a same repetition period and a same phase in repetition cycle as the second QW. However, the layer that the second QW is disposed on, substrate 11, does have the same period and phase as the second QW. Thus, it is taken that the layer that the second QW is disposed on should share the period and phase characteristics of the second QW. Should the parts be rearranged as deemed obvious in the rejection of claim 1, then the second QW will be disposed on the intermediate layer. Thus, it is obvious that after the rearrangement of parts, the intermediate layer will have the same period and phase as the second QW.

Regarding claims 4-5, the refractive index of the barrier layer is lower than the refractive index of the intermediate layer.

Regarding claims 6, 8, and 10, the refractive index relationships as claimed are not disclosed. However, this is due to the materials used for the various parts. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make these various layers using materials so that the refractive index relationships are satisfied, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claim 7, the refractive index of the intermediate layer is substantially the same as the refractive index of the first barrier layers.

Regarding claim 9, the thickness of the intermediate layer 16 is less than 300 nm.

Regarding claims 11-13, the substrate is made of InP. It is not disclosed that the various layers are made from the materials as claimed, however these materials are all known in the art as usable in such layers of lasers. See the rejection regarding materials in the above rejection of claims 6, 8, and 10.

Regarding claim 14, the burying layer 15 is made of InP.

Regarding claim 15, there is an InP clad layer above all of the QWs. There is not disclosed that the burying layer be made of InGaAsP. See the rejection regarding materials in the above rejection of claims 6, 8, and 10.

Regarding claim 16, it is not disclosed that the laser forms a mesa or ridge type structure. Such structures are well known in the art. It would have been obvious to one skilled in the art to

Art Unit: 2828

make the laser into such a structure because then current confinement is easily done through the shape of the ridge or mesa, as is well known.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. These references disclose DFB lasers having quantum well or semiconductor material disposed as a part of the grating.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (703) 605-4367. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JM
August 1, 2002


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